2d. That voyagers for business or profit are at such extra risk only so far as the character of the climate, the length of stay, and question of acclimation are concerned.

The general deductions from the facts adduced may be thus epitomized :—

1st. The occupation of seafaring men is more hazardous than is generally supposed.

2d. Railroad employés (excepting brakemen) are as much as, and perhaps more, likely to attain long life than other classes of men, and—

3d. That travellers, unless when too long delaying in unhealthy climates, and so becoming residents, do not especially increase their liability to death.

ART. XI.—*Remarkable Case of Traumatic Hypertrophy (including Elongation) of Digital Phalanges.* Reported by J. A. LIPPINCOTT, M.D., Late Resident Physician at the Pennsylvania Hospital.

THE following case was admitted into the Pennsylvania Hospital Feb. 12, 1875, under the care of Dr. William Hunt, Visiting Surgeon, by whose permission it is reported.

Thomas H., a healthy labourer of healthy extraction, æt. 25, applied for admission on account of an hypertrophied condition of the ring finger of the right hand. His mother states that, when he was two years old, a large stone with which he was amusing himself, fell on his finger, injuring the end of it severely. From that time, that portion of the digit began to enlarge. One year afterwards the affected finger was bent violently backwards in a fall, and subsequently the whole finger steadily increased in size until the hand ceased to grow. A rigid cross-examination elicited the positive and reiterated assertion that the hand was perfectly natural at birth and up to the time of the accident.

On admission the patient is five feet nine inches in height, and fairly well proportioned. The following table shows the measurements of the affected finger, as compared with those of the corresponding finger of the other hand :—

	Normal Finger.	Affected Finger.
Length of finger	4 in.	5 in.
" of proximal phalanx	$1\frac{14}{16}$ in.	$2\frac{2}{16}$ in.
" of middle "	$1\frac{2}{16}$ in.	$1\frac{12}{16}$ in.
" of distal "	1 in.	$1\frac{2}{16}$ in.
Circumference of proximal phalanx in centre .	$2\frac{8}{16}$ in.	$3\frac{5}{16}$ in.
" of proximal phalanx at distal end	$2\frac{11}{16}$ in.	$3\frac{10}{16}$ in.
" of middle phalanx in centre .	$2\frac{4}{16}$ in.	$3\frac{6}{16}$ in.
" of middle phalanx at distal end .	$2\frac{3}{16}$ in.	$3\frac{1}{16}$ in.
" of distal phalanx in centre .	$2\frac{1}{16}$ in.	$3\frac{1}{16}$ in.
Greatest width of nail	$\frac{9}{16}$ in.	$\frac{15}{16}$ in.
Length of nail (cut close)	$\frac{9}{16}$ in.	$\frac{11}{16}$ in.

The finger is natural in colour, smooth to the touch, and, as will be seen by reference to the table, pretty uniformly enlarged. The condyles are disproportionately prominent. Two knobs project from the sides of the middle phalanx. The lateral diameters are everywhere proportionately greater than the dorso-palmar. The finger is straight, with the exception of a slight fixed flexion at the last articulation. There is perfect motion at the metacarpo-phalangeal articulation, and slight mobility at the two others. The metacarpal end of the proximal phalanx projects, from its enlargement, into the palm of the hand, and the cuticle over it is much thickened. The soft tissues seem somewhat thinner than on the other finger. Sensation is normal, except when the finger is subjected to cold, which readily affects it (particularly the extremity), and gives him considerable distress at times. This discomfort, as well as the annoyance and inconvenience which he experiences from the presence of so unwieldy a member while at work, have induced him to have the finger removed.

The middle finger of the same hand was also injured at the time of the first accident. There is no hypertrophy, but there is a slight lateral flexion with subluxation at the last joint, the extremity inclining towards the index finger.

Dr. Hunt amputated at the metacarpo-phalangeal articulation. The operation was followed by rather active inflammation, with moderately profuse suppuration. These symptoms, however, gradually subsided, and the patient was discharged cured April 12, 1875.

On examination of the finger after removal, the digital artery on the radial side was found to be much enlarged in calibre, and its coats very considerably thickened, but there was no evidence of atheromatous or other degenerative change.

The specimen was examined by Dr. Morris Longstreth, Pathologist and Curator to the Hospital, from whose report the following extract is taken:—

"An incision, made through the skin on the palmar surface of the first and second phalanges, shows the cutaneous tissues to be thicker than is normal; about in the proportion to the increased size of the finger. The adipose tissue is as usual. The sheath of the flexor tendons is unusually thick and firm. The combined flexor tendons are markedly thickened, measuring at the base of the first phalanx two inches in circumference. They are received into a correspondingly capacious groove on the palmar surface of the bone, the antero-posterior diameter of which in the median line ranges between three-eighths and five-eighths of an inch. The posterior. surface is convex from side to side so that a transverse section of the bone is crescentic in outline. The aponeurosis of the extensor communis digitorum is enlarged; apparently in proportion to the general hypertrophy of the finger. The first phalanx was divided longitudinally, one-half being removed for examination microscopically.

"After careful microscopic examination of section of the bone, every portion appeared normal, both as to the size and to the arrangement of its minute anatomy."

Remarks.—This case is interesting, because traumatic elongation of the fingers is exceedingly rare, if, indeed, it has ever before been described. Annandale, in his interesting work on *Malformations, Diseases and Injuries of Fingers and Toes*, p. 5, relates two congenital cases of elongation of the fingers, and alludes to several others. Curling (*Med.-Chir. Trans-*

actions, vol. xxviii. p. 337) mentions six cases, one of which came under his own observation. Dr. Ewald, of Berlin (*Virchow's Archiv*, Bd. 56, s. 421) describes a case of elongation of the index and middle fingers of the left hand. Adams, of Dublin, relates a case in which the middle finger of the left hand was eight inches long, while the corresponding finger of the other hand was three and a half inches (quoted by Friedberg in *Virch. Archiv*, Bd. 40, s. 373). Friedberg, in the same paper, refers to a case of Meckel's, of elongation of the right forefinger; but all of the above-mentioned cases, like those mentioned by Annandale, were congenital. Rokitansky (*Pathol. Anat.*, vol. iii. p. 122) remarks: "Sometimes elongation is observed only in particular fingers, toes, or limbs;" and adds that it may be congenital or come on after birth; but there is nothing in the context to warrant the supposition that he had met with non-congenital lengthening of the fingers. Prof. Friedreich, of Heidelberg (*Virch. Archiv*, Bd. 43, s. 84) relates a very interesting case of non-congenital elongation of the phalanges of the fingers, associated with hypertrophy of various other bones, which began at the age of eighteen; but in this case there was no history of an injury, nor, indeed, was there any assignable direct cause.

The fact of bones sometimes undergoing elongated hypertrophy does not seem to have occurred to the older writers. The comprehensive and valuable works of Boyer, Lobstein, and others, while they treat of hypertrophy of osseous tissue, contain no allusion to increase in length. But very brief reference is made to the subject in the modern standard works on surgery.[1] Stanley, who seems to have had more experience of elongation of bone than perhaps any other writer, and to whom Paget, in his *Surgical Pathology*, vol. i. p. 83, acknowledges his indebtedness for most of his information on the subject, says: "Long bones are often increased in thickness, but rarely in length."[2] He relates instances of elongation of the femur, tibia, and fibula, and states that talipes and curvature of the spine, as well as great inconvenience in walking, may result from this form of hypertrophy in the lower limbs. He and other writers describe a peculiar form of curvature of the tibia arising as a consequence of lengthening of this bone, while the fibula remains of normal length, and the uniting ligaments refuse to yield.

As to the etiology of non-congenital elongation, all authors agree that it always takes place before the natural growth of the osseous tissue ceases. Prof. Friedreich's case, already referred to, makes it probable that family predisposition has a causative influence, as one of the patient's brothers was very similarly affected. Volkmann (Pitha und Billroth's *Handbuch der Chirurgie*, Bd. ii. Abth. ii. s. 350) assigns as a cause the removal of physiological pressure, and gives, as an example, lengthening of the radius after dislocation from its connections with the humerus. Broca (*Des Aneurismes*, Paris, 1856, p. 76) relates a case of aneurismal varix of the thigh, three centimetres below Poupart's ligament, which was followed by an increase of three centimetres in the length of the limb, the femur being one centimetre and the tibia two centimetres longer than the corresponding bones of the other limb In Mr. Holden's case, mentioned by Paget (*Surgical Pathology*, vol. i. p. 87), the elongation, which affected the femur, was *compensatory*, and was equal to the shortening of the tibia and fibula, which were atrophied from necrosis.

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[1] In view of the comparative scantiness of literature on the subject, the extraordinary and unchallenged assertion of one of the members of the Pathological Society of London to the effect that real elongation of bone "was not described anywhere in surgical works," is perhaps excusable. (*Vide Brit. Med. Journal*, Feb. 20, 1875, p. 257.)

[2] Diseases of the Bones, Phila., 1849, p. 25.

In the great majority of cases the disease owes its origin to specific or non-specific inflammation and ulceration of the bone, or of the neighbouring soft parts. Erichsen (*Science and Art of Surgery*, vol. ii. p. 158) says: "I have seen, as the result of chronic osteitis, the tibia from one and a half to two inches longer than its fellow." Langenbeck states that morbid changes which give rise to irritation and hyperæmia of the osseous tissue, may lead to increase in length as well as in thickness of bones.[1] In all of Stanley's cases, with one exception, there were numerous chronic ulcers over the affected bone. The case excepted was that of a strumous patient who was afflicted with an abscess of the thigh. When the discharge from the abscess ceased, the tibia of the opposite leg began to enlarge in every direction, and four years subsequently it was found to be an inch and a half longer than the tibia of the other limb. In a case described by Humphry (*Med.-Chir. Transactions*, vol. xlv. p. 300) there was a sinus on the inner side of the left thigh, communicating with the femur, which was one inch longer than the femur of the right side. M. Guibout exhibited before the Société Médicale des Hôpitaux, a patient suffering from tertiary syphilitic manifestations, whose right leg had undergone lengthening to the extent of two-thirds of an inch.[2] Gross (*System of Surgery*, 5th edit., vol. i. p. 885) mentions a case of lengthening as well as of thickening of the bones of the leg and foot, the result of extensive ulceration. Volkmann (in Pitha und Billroth's *Handbuch der Chirurgie*, Bd. ii. Abth. ii. s. 296) refers to a case described by Weber, in which, after necrosis of the tibia and fibula, these bones were six inches longer than those of the other limb.

Sometimes it is difficult, if not impossible, to arrive at any adequate explanation of this form of hypertrophy.

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[1] Quoted in Erichsen's Surgery, vol. ii. p. 179.

[2] Quoted from L'Union Médicale in Boston Med. and Surg. Journ., July 4, 1872, p. 15.

Benjamin W., æt. 21, was admitted into the Pennsylvania Hospital in December, 1874, complaining of pain in the right hip-joint. He was supposed to be suffering from morbus coxarius and curvature of the spine. Careful examination excluded the idea of disease of the joint, and the curvature, which was easily made to disappear, was found to be owing to an elongation of the femur to the extent of an inch and a quarter. The patient stated with great positiveness that he had no deformity of any kind before the age of sixteen.

In this case there was apparently no hereditary or acquired predisposition to account for the abnormal growth, and there was no history of injury or of any other exciting cause.

The minute pathology of elongation, as distinguished from other forms of hypertrophy of bone, has not attracted much attention. Rindfleisch, who stands pre-eminent in this field of study, does not allude to it. The recently published lectures of Wilks and Moxon also do not mention the subject. Humphry attributed the lengthening in his case to the disease in the lower part of the shaft of the femur acting as a stimulus to preternatural activity of the growing processes in the epiphysial line. Volkmann (Pitha und Billroth's *Handbuch der Chirurgie*, Bd. ii. S. 350) is of the opinion that the elongation is due to irritation and increased blood-flow, which extend to the epiphysial cartilages and set up in them increased cell-production. Paget (*Surg. Path.*, vol. i. p. 82) says :—

> "The elongation of the bones in these cases may occur in different instances in two ways. In some cases it seems due to that change in bone . . . . which consists in the deposit of the products of inflammation in the interstices of the osseous tissue, their accumulation therein, and the remodelling of the bone around them as they accumulate. . . . But, in other cases, the elongation is probably due to the more genuine hypertrophy which follows the increased flow of blood."

In regard to the treatment of this form of hypertrophy there is not much to be said. Drugs are powerless to check the progress of the disease or to diminish the size of the enlarged bone. When, as in the present case, the affected structure constitutes an unsightly and inconvenient deformity which can be removed, partial or complete amputation ought to be resorted to. When the disease occurs in one of the bones of the lower extremities, it is easy to mitigate the consequent difficulty in walking by having one boot-sole made thicker than the other. In shortening of one of these bones after fracture, Rizzoli, an Italian surgeon, recommends breaking the corresponding bone of the other limb and allowing the fragments to overlap, so that shortening equal to that in the first-broken bone may take place.[1] It would certainly be quite as justifiable to break an elongated bone—and, by Rizzoli's method—to reduce it to its original length. Neither this nor any other surgical operation, if performed in adult life, is open to the objection that the disease may recur, since experience has shown that the bones exhibit no tendency to undergo elongated hypertrophy after the developmental period is past.

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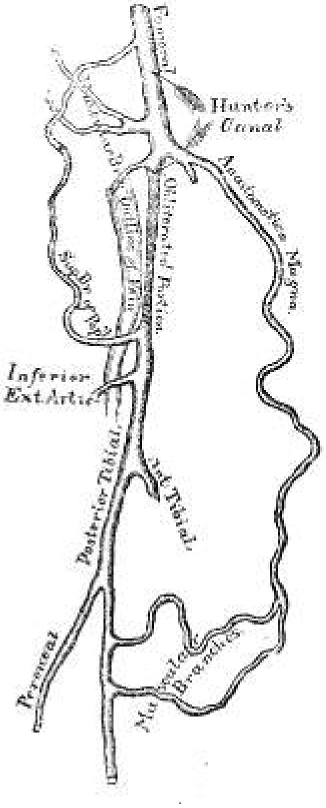
[1] Pitha u. Billroth, Bd. ii. Abt. ii. S. 249.

ART. XII.—*Occlusion of the Popliteal Artery, with establishment of the Collateral Circulation.* By JNO. A. WYETH, M D., Assistant to the Chair of Anatomy at the Bellevue Hospital Medical College, New York. (With a wood-cut.)

THE subject from which this specimen was taken was a negro man, about thirty years of age. The occlusion was in the popliteal artery of the left leg. The case was found in the dissecting rooms of the Bellevue Hospital Medical College.

A close examination of the condition of the vessel, while I was making the dissection, led me to infer that the primary occlusion was opposite the knee-joint, near the middle of the popliteal artery. The vein was more closely adherent here than at any other point, and the obliterated vessel was more fibrous here than either above or below.



It is most probable that the accident was the result of atheromatous and subsequent calcareous degeneration of the vessel, upon the roughened inner coat of which the *thrombus* gathered, that led to the complete occlusion.

That the calcareous degeneration found in the specimen did not result from an embolus lodging here, and interfering with the nutrition of the vessel, is evident from the following facts :—

1st. An embolus in all probability would not have lodged at this point, but would have been forced lower down and arrested at the bifurcation, into anterior and posterior tibial, only a few inches further, where there was a marked diminution in the caliber of the arteries.